

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Utility Application of:
John E. Madocks

Application No.: 10/571,214

Confirmation No.: 2216

Filed: March 9, 2006

Art Unit: 1795

For: MAGNETIC MIRROR PLASMA SOURCE

Examiner: M. A. Band

DECLARATION OF JOHN E. MADOCKS

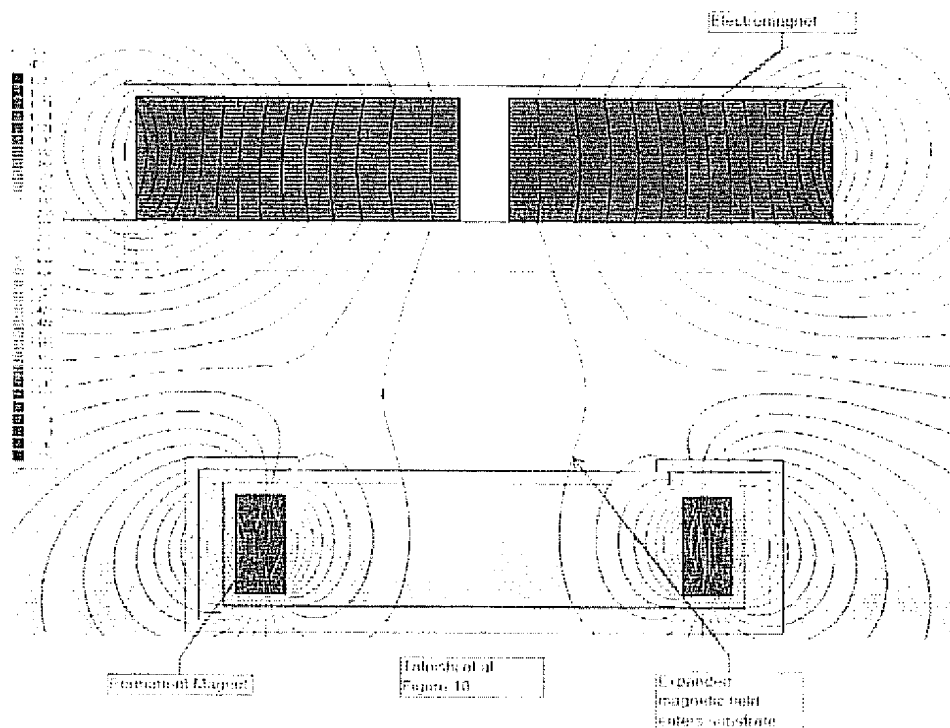
I, John E. Madocks, declare as follows:

1. Over the past 29 years I have worked in the large area vacuum thin film coating industry and have particularly focused on developing plasma deposition sources for the last 10 years. I have authored or coauthored over 30 scientific publications in the field and been named as an inventor on over 12 patents (with another 13 pending).

2. I have reviewed and am familiar with U.S. Patent 4,853,102 entitled "Sputtering Process and an Apparatus for Carrying Out the Same". I am the inventor on the above-identified patent application, U.S. Patent Application 10/571,214 ("the application"), and I have read the Office Action dated June 9, 2010 ("the Office Action"). I understand that claims 1-5, 9-11, 14, 21-27 and 29 are considered to be obvious over U.S. Patent 4,853,102. I also understand from my review of the interview summary dated August 12, 2010, that uncertainty remains as to whether magnetic field strength ratio of greater than 2 to 1 between the deposition surface of the substrate and the gapped cathode provided through amendments to the specification are not adequately supported by the application as filed.

3. I state as a worker in the field that it is readily apparent from the application as filed that I would understand the pending application to relate to a magnetic mirror confinement system and that the application figures, and in particular Figs. 1A and 1B, make clear the nature of the ratio of magnetic field strength being shown graphically in the application figures as filed are with the same magnetic field lines extending from a given linear extent to the substrate surface and expanding to a linear extent of about five times greater at the cathode, that amendments to the specification simply make the same explicit. As a practitioner in this field, I submit that there is no other physically feasible interpretation of the 2:1 ratio upon viewing Figs. 1A and 1B other than that detailed above.

4. I have performed a magnetic analysis of the arrangement provided in U.S. Patent 4,853,102, Fig. 10, and this is provided below.



It is apparent to me from this analysis that a mirror field according to the pending application is not created between the substrate and the top electrode. In fact, the opposite is the case: the open end of a weak mirror passes into the substrate and no mirror confinement is produced nor is the ratio field strength as currently being claimed present. In contrast to this analysis, the open end of the magnetic mirror in the present invention is at the electrode surface and not at the substrate.

5. Additionally, I note that U.S. Patent 4,853,102 with respect to Fig. 10, or the other figures for that matter, all fail to show field lines passing through the substrate into the top electrode and instead details a cusp field generated in the center of the gap region between the substrate and electrode, and as such no magnetic mirror confinement is provided in this patent. I also note that the permanent annular magnet in this patent is not positioned under the substrate but rather placed outside the substrate to provide magnetic field lines as shown in the above analysis that are not axial with a magnetic field source as required by the pending claims. Additionally, with respect to this figure I note that the arrows indicate an opposite configuration from a magnetic mirror source in that the field lines are opening toward the substrate and as such are weaker near the substrate than at the electrode and wholly inconsistent with a stronger field at the substrate relative to the electrode as being claimed. As such, this patent cannot satisfy the ratio of magnetic field strength as being claimed and disclosed in the pending application.

6. Also in regard to this patent, I see no other teachings in any of the text or figures consistent with magnetic mirror plasma confinement.

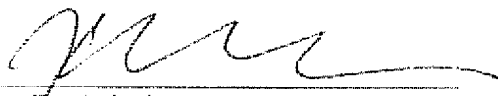
- Specifically, Fig. 1 of this patent shows a cusp field with field lines clearly not passing through the substrate and the electrode.

- Fig. 7 shows a reverse magnetic mirror field with the weaker field lines passing through the substrate relative to the electrode; again, this is contrary to the pending application as detailed and claimed.
- Fig. 8 again depicts a reverse mirror field relative to that of the present application with weaker field lines passing to the substrate relative to the electrode.
- Figs. 10 and 11 of this patent likewise show an opposite mirror field relative to that of the present invention.

7. Based on my review and magnetic analysis of this patent, I believe this patent at best teaches an opposing configuration to that of the pending application with a stronger field at the electrode relative to the substrate surface in direct contradiction to that of my pending application. As such, I believe that none of my colleagues in the field or myself could not have derived the pending application invention from a review of this patent.

8. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true. These statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: Oct 19 2010



John E. Madocks